Process Simulation and Modeling with Aspen HYSYS Training Course

02 - 06 Nov 2026

Kuala Lumpur

5200 € (Per Person)

Ref: #ACE2748_197275

Course Introduction / Overview:

This course provides a comprehensive and practical guide to process simulation and modeling using Aspen HYSYS, the industry-standard software for chemical and process engineering. Participants will journey from fundamental principles to advanced applications, mastering the skills needed to design, analyze, and optimize complex industrial processes. The curriculum is structured to build confidence, starting with the basic HYSYS environment and progressing to steady-state and dynamic simulations of intricate systems. As emphasized by renowned academic William L. Luyben in his seminal work, "Process Modeling, Simulation, and Control for Chemical Engineers," a deep understanding of simulation is critical for modern engineering. This program, offered by BIG BEN Training Center, bridges the gap between theoretical knowledge and practical application, enabling engineers to tackle real-world challenges in process design, troubleshooting, and performance improvement. By exploring thermodynamic fluid packages, unit operation modeling, and process optimization techniques, attendees will learn to build robust and predictive models that enhance safety, efficiency, and profitability in plant operations. This training is designed to be an immersive experience, equipping participants with the expertise to leverage Aspen HYSYS for innovative engineering solutions.

Target Audience / This training course is suitable for:

- Chemical Engineers.
- Process Engineers.
- Plant Design Engineers.
- Operations Engineers and Personnel.
- Research and Development Scientists.
- Project Engineers and Managers.
- Junior and Senior Engineers seeking to enhance their simulation skills.
- Technical specialists involved in process troubleshooting and optimization.

Target Sectors and Industries:

- Oil and Gas Exploration and Production.
- Petroleum Refining and Petrochemicals.
- Chemical and Specialty Chemical Manufacturing.
- Engineering, Procurement, and Construction (EPC).
- Power Generation and Utilities.
- Pharmaceuticals and Biotechnology.
- Governmental bodies and environmental agencies.
- Consulting firms specializing in process engineering.

Target Organizations Departments:

- Process Engineering and Design.
- Operations and Production.
- Research and Development (R&D).
- Technical Services and Support.
- Plant and Facilities Engineering.
- Health, Safety, and Environment (HSE).
- Project Management.
- Asset Integrity and Management.

Course Offerings:

By the end of this course, the participants will have able to:

- Navigate the Aspen HYSYS simulation environment with confidence.
- Select appropriate thermodynamic fluid packages for various chemical systems.
- Develop and build accurate steady-state process flowsheets from scratch.
- Model a wide range of unit operations, including pumps, compressors, and heat exchangers.
- Simulate complex separation processes like distillation and absorption columns.
- Configure and analyze different types of chemical reactors.
- Transition from steady-state to dynamic simulation for process control analysis.
- Implement basic control strategies and analyze system responses to disturbances.
- Utilize HYSYS tools for process optimization and troubleshooting.
- Generate customized reports and interpret simulation results for decision-making.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to foster a deep, practical understanding of Aspen HYSYS through an immersive and interactive learning environment. This course heavily emphasizes a hands-on approach, where participants spend a significant portion of their time building simulation models and solving practical engineering problems directly within the software. Theoretical concepts are introduced through clear, concise presentations and are immediately reinforced with guided workshops and real-world case studies drawn from the oil and gas, refining, and chemical industries. The learning process is highly collaborative, encouraging participants to engage in group discussions and teamwork to analyze complex scenarios and develop optimal solutions. Our expert instructors facilitate these sessions, providing personalized feedback and guidance to ensure every participant masters the key competencies. This blend of instructor-led training, practical application, and peer-to-peer learning ensures that attendees not only learn the software's functionalities but also develop the critical thinking skills required to apply process simulation effectively in their professional roles.

Course Agenda (Course Units):

Unit One: Fundamentals of Process Simulation and the HYSYS Environment

- Introduction to process modeling and simulation concepts.
- Overview of the Aspen HYSYS interface and navigation.
- Starting a new simulation and defining the basis environment.
- Selecting and configuring thermodynamic fluid packages.
- Adding components and creating a component list.
- Building a basic process flowsheet with simple unit operations.
- Understanding stream properties and phase behavior.

Unit Two: Modeling Core Unit Operations and Fluid Flow

- Simulating pumps, compressors, and expanders.
- Modeling heat exchangers, coolers, and heaters.
- Configuring valves and understanding pressure drop calculations.
- Using separators, including two-phase and three-phase vessels.
- Modeling pipelines and pipe segments for hydraulic analysis.
- Utilizing the workbook and property tables for data analysis.
- Introducing logical operations like the balance and adjust tools.

Unit Three: Simulating Separation Processes and Chemical Reactors

- Setting up and converging distillation columns.
- Modeling absorption and stripping columns for mass transfer.
- Simulating liquid-liquid extraction processes.
- Introduction to chemical reaction modeling in HYSYS.
- Configuring conversion, equilibrium, and Gibbs reactors.
- Defining reaction sets and associating them with fluid packages.
- Analyzing reactor performance and product distribution.

Unit Four: Introduction to Dynamic Simulation and Process Control

- Understanding the transition from steady-state to dynamic modeling.
- Preparing a flowsheet for dynamic simulation and adding specifications.
- Sizing equipment and vessels for dynamic analysis.
- Introducing and configuring PID controllers.
- Developing control strategies for common process loops.
- Running dynamic simulations and analyzing transient behavior.
- Performing safety valve sizing and relief system analysis.

Unit Five: Process Optimization, Troubleshooting, and Advanced Features

- Using the HYSYS optimizer for process improvement.
- Conducting case studies and sensitivity analysis.
- Troubleshooting common convergence issues in simulations.
- Integrating spreadsheets for complex calculations and data transfer.
- Customizing reports and plotting simulation data.
- Exploring advanced topics like crude oil characterization.
- Final project involving a comprehensive plant simulation case study.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

How can process simulation models be validated to ensure they accurately represent real-world plant behavior, and what are the risks of over-reliance on unverified simulations in critical decision-making?

What unique qualities does this course offer compared to other courses?

This course distinguishes itself by focusing on the practical application of process simulation principles rather than merely teaching software commands. While many programs cover the "how," we emphasize the "why" by integrating fundamental chemical engineering theory with hands-on, problem-solving workshops. Our curriculum is uniquely structured to build a robust conceptual foundation, enabling participants to troubleshoot complex convergence errors and make informed engineering judgments. The inclusion of both steady-state and dynamic simulation provides a holistic view of process behavior, a dual-focus often missing in introductory courses. We utilize real-world case studies from diverse industries, challenging participants to model scenarios that mirror the complexities they face professionally. Furthermore, the course content is continuously updated to reflect the latest software features and industry best practices, ensuring the skills learned are current and immediately applicable. The emphasis on optimization and process control in the final modules equips attendees not just to model processes, but to actively improve them, delivering tangible value to their organizations.